

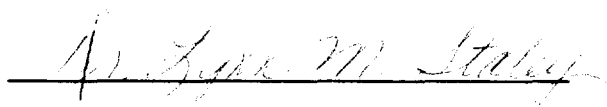
**The Relationship Between Young Children's Understanding of Conservation and
Beginning Reading**

An Honors Thesis (HONRS 499)

By

Jennifer A. Givens

**Thesis Advisor
Dr. Lynn M. Staley**

A handwritten signature in cursive script, reading "Dr. Lynn M. Staley", is written over a horizontal line.

Ball State University

Muncie, Indiana

April, 1998

May, 2000

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**The Relationship Between Young Children's Understanding of Conservation
and Beginning Reading**

Jennifer A. Givens

Ball State University

Advisor: Dr. Lynn M. Staley

The purpose of this study was the examination of the relationship between young children's developing reading ability and their understanding of conservation, particularly conservation of matter.

A Piagetian task for conservation of matter was used to determine children's understanding of conservation. These results were compared to scores on a standardized unit reading skills assessment in the Harcourt Brace *Treasury of Literature* series using a T test. Analysis of the results produced the conclusion that there is not a correlation between development of conservation and beginning reading.

These tests were performed at an elementary school in Indiana, serving grades kindergarten through five. The test subjects were members of a first grade class.

To Future Honor Students:

Why I Chose This Topic

**The Relationship Between Young Children's Understanding of
Conservation and Beginning Reading**

I chose to examine the relationship between the development of conservation of matter and reading ability in first grade children after a professor mentioned the idea that there might be a correlation between the two one morning in class. As an elementary education major, I enjoy working with children, so this type of project seemed ideal for me. More importantly, I found the idea fascinating, one I might choose to research for my own interest.

Dedication

I would like to dedicate this to:

My parents, who love me unconditionally,
support me in everything that I do,
and always see only the best in me.

My brother, who keeps me from
taking life *too* seriously.

Dr. Staley, whose confidence in me
inspires me to achieve more than
I ever imagined I could.

Thank you.

Dr. Church, who first made me
believe in myself and my ability to
excel in college.

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Part I

Statement of the Problem

Introduction

The development of conservation of matter occurs when children understand that while the form of matter may change, the matter itself remains the same. As children learn to read, they must not only memorize twenty-six letters and the sounds that those letters make, but also the complex sound-symbol relationships, particularly that between the symbols for upper and lower-case letters. Different shapes represent both the same and different sounds, for example, c = ka, while C also = ka. This study examines the relationship between beginning reading and the conservation of matter, focusing on the understanding of different shapes representing the same letter.

Purpose of Study

The purpose of this study was to examine the relationship between young children's understanding of conservation and beginning reading.

Background and Significance of Study

As a future educator of young children, I am interested in discovering why some children have considerably more difficulty with reading than others. I value reading highly; any information that might lead educators to understand and assist struggling developing readers would be valuable.

Hypothesis

The following hypothesis was examined: Children who have not yet developed conservation of matter may encounter difficulty in reading.

Research Question

This study examined the question: Do children who possess an understanding of conservation of matter score better on reading skill assessment?

Definition of Terms

The following terms were used throughout this study:

Children: Males and females enrolled in first grade in a public elementary school

Conservation: Piaget's conservation of matter; the understanding that the amount of matter remains the same even though its shape is changed.

Beginning Reading: Reading skill ability based on standardized assessment performance

Assumptions of the Study

The following assumption was made by the researcher in this study:

1. The Harcourt Brace Unit Reading Skills Assessment accurately reflected the child's reading ability.

Limitations of the Study

The study was limited in the number of subjects. There were seventeen total subjects. Among those, only three understood conservation of matter. This was not a large enough sample and the number in each group was not comparable.

Organization of the Study

Part I of the study contains an introduction to the study. It also lists the various components of the study, including the purpose, background and significance, hypothesis, research question, definition of terms, assumptions, and limitations of the study. Part II summarizes the literature reviewed pertaining to young children's development of conservation and beginning reading. Part III explains the methodology of the study, containing the hypothesis, sample, and instrument used. Part IV states the results of the study. It also reiterates the introduction, hypothesis, sample, instrument, and data analysis. Part V contains the summary, conclusions, and recommendations.

Part II

Review of Related Literature

Introduction

The purpose of this study was to determine if there was a positive correlation between the development of Piaget's conservation of matter and reading ability in first grade children. I began my research by reviewing previously written material on the subject.

Literature Review

Conservation is, according to Worth:

The ability to recognize that certain properties remain the same even though some physical transformation, which violates the child's perception, has occurred.

There are several categories of conservation, including conservation of number, space, time, substance, weight, volume, and matter (Hooper, Sigel, 41). All conservation tasks share certain characteristics and involve the same underlying structures. Children develop conservation skills at differing rates and can successfully complete some conservation tasks before others. Research has shown little success in teaching children conservation (Scandura, 40).

Logical Thinking in Children discussed some of the social applications of conservation; the cognitive processes necessary for success at conservation tasks are prerequisites for many social concepts. For example, in order to understand certain generalizations or commonalities across time, an individual must first have acquired conservation of invariants, that is, that certain things remain constant in the midst of change (428).

Most relevant to my research was the study performed by Violet B. Robinson on The Performance of Readers and Prereaders on Concrete Operational Tasks. This examined the performance of three groups of prekindergarten and kindergarten on various conservation tasks and compared those findings with the reading ability of those same children. According to Robinson's research, the relationship between concrete operational thought and the acquisition of conservation to success in beginning reading

is a subject of debate. Previous researchers have come to conflicting conclusions. According to Murray, concrete operations are a "sufficient condition rather than a necessary condition for beginning reading." Ginsberg and Oppen argued that Piaget's theory had "little if anything to say about beginning reading. . . ." Other researchers, including Gallagher, Waller, and Murray found a low correlation between the acquisition of conservation and reading comprehension. However, several studies published since 1976 found that children reading at or above grade level performed significantly better on conservation tasks than those children reading at a lower level (Cox). Studies performed examining classification and seriation skills and reading ability have shown higher correlations.

Robinson tested three groups of children in kindergarten and prekindergarten in different communities. Her research was completed over a period of ten years. She asked teachers to identify children in their classes who were reading and then administered a standardized reading achievement test (Wide Range Achievement Test) to those children. They were classified as readers or prereaders on the basis of their performance on the test. Robinson then administered five Piagetian tasks, including two conservation of number and quantity tasks. She assigned scores based on correct responses and explanation and compared the scores of the children identified as prereaders with those of the readers. Results showed no difference in the scores of either group, leading to the conclusion that children do not need to be concrete operational in order to learn to read.

Part III

Methodology

Introduction

The purpose of this study is to examine the relationship between young children's understanding of conservation and beginning reading.

Hypothesis

The following hypothesis was examined: Children who have not yet developed conservation of matter may encounter difficulty in reading.

Sample

The sample was obtained at a public elementary school in Indiana. The school serves grades kindergarten through fifth. The children directly involved in the study were members of a first grade class in the school.

Subjects

All seventeen subjects were members of the same first grade class. Subjects were selected based on return of a parental permission form and individual willingness.

Instrument

The reading assessment used in this study was the Harcourt Brace Unit Reading Skills Assessment. This is a standardized assessment with a criterion score indicating average reading proficiency at grade level. The assessment considers three skill areas: decoding, including phonic and structural analysis; vocabulary; and comprehension, including sequence. Scores in each of these areas are combined in a total score for the assessment. The assessment contains thirty-four items. The criterion score is twenty-six. Scores above twenty-six indicate higher reading skill; scores below indicate difficulty in reading skill areas.

The Piagetian task used in this study was one designed to test conservation of matter. This task was taken from a packet of Piagetian tasks, designed for and obtained from the Educational Psychology Department at Ball State University. The task entailed

presenting a child with two clay balls of equal size. When the child agreed that the balls contained the same amount of clay, one was rolled into a sausage shape while the child watched. The child was then asked if the two shapes had the same amount of clay and a "yes" or "no" answer was recorded. No prompting or reaction was given to responses.

Permission

The Ball State Institutional Review Board was contacted for approval of using human subjects in a research project (see Appendix A). The Muncie Community Schools were also contacted for permission to conduct research in the schools (see Appendix B). Subjects' parents were sent a permission form describing the study and requesting permission for their child's participation (see Appendix C).

Procedures

The project began with a discussion of the research to obtain consent from the teacher of the participating first grade class. This was followed with a proposal submitted to the school principal (see Appendix D), who then wrote a letter of permission for the application to the Muncie Community Schools.

Upon receiving permission from the schools, IRB forms were completed and submitted for approval. Once approval was granted, permission slips were sent home with students to obtain parental permission for participation in the study. One week later, those children with permission slips were administered the Piagetian task for conservation of matter (see Appendix E). The task was administered by the researcher in the classroom, in an area secluded from other students but in view of the classroom teacher. Scores on the reading assessment (see Appendix F) were obtained from the teacher, who had administered it during class prior to the researcher's arrival. After testing was completed, a follow-up letter was sent home to parents of participating children (see Appendix G).

Analysis of Data

Seventeen children took part in the study, out of a class of twenty-three. Nine of the subjects were male, eight female.

A T-test to determine correlation between the two sets of data was performed on the results of the reading assessment and conservation task. A score of 1 was assigned to responses of "yes" on the conservation task, while responses of "no" were assigned a score of 2. The mean value of the scores on the reading assessment was then found for subjects in the "yes" group (Group 1) and those in the "no" group (Group 2). A mean score of 27.33 was determined for Group 1, while a mean score of 24.23 was determined for Group 2. The discrepancy between these scores is statistically insignificant, as there is a high (.455) probability of such a discrepancy occurring. In order for the difference to be significant, the probability of its occurrence would have to be .025 or less.

Chapter Summary

Based on the administration of the reading assessment and the task for conservation of matter, results show that there is no correlation between understanding of conservation and beginning reading.

Part IV

Results of the Investigation

Introduction

The purpose of this study is to examine the relationship between young children's understanding of conservation and beginning reading.

Hypothesis

The following hypothesis was examined: Children who have not yet developed conservation of matter may encounter difficulty in reading.

Sample

The sample was obtained at a public elementary school in Indiana. The school serves grades kindergarten through fifth. The children directly involved in the study were members of a first grade class in the school.

Subjects

All seventeen subjects were members of the same first grade class. Subjects were selected based on return of a parental permission form and individual willingness.

Instrument

The reading assessment used in this study was the Harcourt Brace Unit Reading Skills Assessment. This is a standardized assessment with a criterion score indicating average reading proficiency at grade level. The assessment considers three skill areas: decoding, including phonic and structural analysis; vocabulary; and comprehension, including sequence. Scores in each of these areas are combined in a total score for the assessment. The assessment contains thirty-four items. The criterion score is twenty-six. Scores above twenty-six indicate higher reading skill; scores below indicate difficulty in reading skill areas.

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presenting a child with two clay balls of equal size. When the child agreed that the balls contained the same amount of clay, one was rolled into a sausage shape while the child watched. The child was then asked if the two shapes had the same amount of clay and a "yes" or "no" answer was recorded. No prompting or reaction was given to responses.

Permission

The Ball State Institutional Review Board was contacted for approval of using human subjects in a research project. The Muncie Community Schools were also contacted for permission to conduct research in the schools. Subjects' parents were sent a permission form describing the study and requesting permission for their child's participation.

Procedures

The project began with a discussion of the research to obtain consent from the teacher of the participating first grade class. This was followed with a proposal submitted to the school principal, who then wrote a letter of permission for the application to the Muncie Community Schools.

Upon receiving permission from the schools, IRB forms were completed and submitted for approval. Once approval was granted, permission slips were sent home with students to obtain parental permission for participation in the study. One week later, those children with permission slips were administered the Piagetian task for conservation of matter. The task was administered by the researcher in the classroom, in an area secluded from other students but in view of the classroom teacher. Scores on the reading assessment were obtained from the teacher, who had administered it during class prior to the researcher's arrival. After testing was completed, a follow-up letter was sent home to parents of participating children.

Analysis of Data

Seventeen children took part in the study, out of a class of twenty-three. Nine of the subjects were male, eight female.

A T-test to determine correlation between the two sets of data was performed on the results of the reading assessment and conservation task. A score of 1 was assigned

to responses of "yes" on the conservation task, while responses of "no" were assigned a score of 2. The mean value of the scores on the reading assessment was then found for subjects in the "yes" group (Group 1) and those in the "no" group (Group 2). A mean score of 27.33 was determined for Group 1, while a mean score of 24.23 was determined for Group 2. The discrepancy between these scores is statistically insignificant, as there is a high (.455) probability of such a discrepancy occurring. In order for the difference to be significant, the probability of its occurrence would have to be .025 or less.

Table of Reading Assessment and Conservation Task Score Data

Subject #	Assessment Score	Yes/No Score
1	29	2
2	19	2
3	24	2
4	34	2
5	32	2
6	19	2
7	30	2
8	33	1
9	26	2
10	12	2
11	21	2
12	22	2
13	25	2
14	20	2
15	20	1
16	33	2
17	29	1

Based on the above data, the hypothesis of this study: "Children who have not yet developed conservation of matter may encounter difficulty in reading." was rejected.

Summary of Results

The analysis of the data indicated the following:

1. Children who have not yet developed conservation do not have greater difficulty in reading than those children who have developed conservation.

Part V

Summary, Conclusions, and Recommendations

Introduction

This section includes a summary of the research, conclusions, and recommendations based on the results of this study.

Summary of the Study

Purpose

The purpose of this study was to examine the relationship between young children's understanding of conservation and beginning reading.

Hypothesis

The following hypothesis was examined: Children who have not yet developed conservation of matter may encounter difficulty in reading.

Sample

The sample was obtained at a public elementary school in Indiana. The school serves grades kindergarten through fifth. The children directly involved in the study were members of a first grade class in the school.

Subjects

All seventeen subjects were members of the same first grade class. Subjects were selected based on return of a parental permission form and individual willingness.

Instrument

The reading assessment used in this study was the Harcourt Brace Unit Reading Skills Assessment. This is a standardized assessment considering three skill areas: decoding, vocabulary, and comprehension.

The Piagetian task used in this study was one designed to test conservation of matter.

Permission

The Ball State Institutional Review Board was contacted for approval of using human subjects in a research project. The Muncie Community Schools were also contacted for permission to conduct research in the schools. Subjects' parents were sent a permission form describing the study and requesting permission for their child's participation.

Procedures

The project began with a discussion of the research to obtain consent from the teacher of the participating first grade class. This was followed with a proposal submitted to the school principal, who then wrote a letter of permission for the application to the Muncie Community Schools.

Upon receiving permission from the schools, IRB forms were completed and submitted for approval. Once approval was granted, permission slips were sent home with students to obtain parental permission for participation in the study. One week later, those children with permission slips were administered the Piagetian task for conservation of matter. The task was administered by the researcher in the classroom, in an area secluded from other students but in view of the classroom teacher. Scores on the reading assessment were obtained from the teacher, who had administered it during class prior to the researcher's arrival. After testing was completed, a follow-up letter was sent home to the parents of participating children.

Data Analysis

Seventeen children took part in the study, out of a class of twenty-three. Nine of the subjects were male, eight female.

A T-test to determine correlation between the two sets of data was performed on the results of the reading assessment and conservation task. A score of 1 was assigned to responses of "yes" on the conservation task, while responses of "no" were assigned a score of 2. The mean value of the scores on the reading assessment was then found for subjects in the "yes" group (Group 1) and those in the "no" group (Group 2). A mean score of 27.33 was determined for Group 1, while a mean score of 24.23 was determined for Group 2. The discrepancy between these scores is statistically

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Table of Reading Assessment and Conservation Task Score Data

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7	30	2
8	33	1
9	26	2
10	12	2
11	21	2
12	22	2
13	25	2
14	20	2
15	20	1
16	33	2
17	29	1

Based on the above data, the hypothesis of this study: "Children who have not yet developed conservation of matter may encounter difficulty in reading." was rejected.

Summary of Results

The analysis of the data indicated the following:

1. Children who have not yet developed conservation do not have greater difficulty in reading than those children who have developed conservation.

Conclusions

Summary of the Results

Although the size of the samples rendered results statistically inconclusive, the results supported those found in previous studies comparing reading ability to forms of conservation other than that of matter. This suggests that conservation does not play a significant role in reading ability in young children.

Limitations

The study was limited in the number of subjects. There were seventeen total subjects. Among these, only three understood conservation of matter. This was not a large enough sample and the number in each group was not comparable.

Recommendations

As my research confirmed the results of previous studies suggesting that conservation is not necessary for beginning reading, further research should explore other areas that might impact beginning reading to a greater extent. The research conducted by Violet B. Robinson in *The Performance of Early Readers and Prereaders on Concrete Operational Tasks* (see Part II) suggested a relationship between Piaget's *logic of functions* and beginning reading, more so than between beginning reading and concrete operational tasks, such as conservation. This is an area that should be explored further in future research.

Implications

Although this project has suggested that there is no relationship between young children's understanding of conservation and beginning reading, it remains that some children have greater difficulty in reading than others. As educators, we must continue to research the area of beginning reading in order to help these children. In a society in which reading is of utmost importance in daily life, it is our responsibility to go above and beyond our daily requirements as a teacher, and strive to find the key, to unlock the mystery of reading for all

children. The impact of our work on those children's futures is immeasurable. In teaching them to read, we enable them to succeed.

APPENDICES

TREASURY OF LITERATURE
JUMP RIGHT IN
UNIT READING SKILLS ASSESSMENT

HARCOURT
BRACE

Orlando Atlanta Austin Boston San Francisco Chicago Dallas New York
Toronto London

PART NO. 9997-09709-2

ISBN 0-15-305282-1 (PACKAGE OF 12)

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APPENDIX G

Follow-up Letter

May 2, 1998

Dear Parents,

I would like to thank you for allowing your child to participate in my study for my honors thesis. I have recently finished my research and come to the conclusion that the development of conservation, that is, understanding that the amount of matter does not change even though the form may, has no effect on or relationship with reading ability. My complete study will be available in the classroom within the month; you are welcome to come in and review it. Once again, thank you. I could not have completed this project without your help. If you have any questions or concerns, feel free to contact me at 214-0118.

Sincerely,

Jennifer A. Givens
Ball State University

References

Hooper, F. H., & Sigel, I. E. (1968). *Logical Thinking in Children: Research Based on Piaget's Theory*. Chicago: Holt, Rinehart and Winston, Inc.

Robinson, V. B. (1987). *The Performance of Early Readers and Prereaders on Concrete Operational Tasks: Three Samples*. [Microfiche]. Presented: Annual Symposium of the Jean Piaget Society. Philadelphia, May 1987.

Scandura, A. B. & J. M. (1980). *Structural Learning and Concrete Operations: An Approach to Piagetian Conservation*. New York: Praeger Publishers.

Worth, L. L. (1979). *The Relationship Between Piaget's Conservation and Children's Oral Language Production*. Ann Arbor: University Microfilms International.

APPENDIX A

Institutional Review Board Approval




Ball State University

Academic Affairs
Office of Academic Research and Sponsored Programs

INSTITUTIONAL REVIEW BOARD

TO: Jennifer Givens
Wood Hall
Muncie, IN 47306

FROM: Daniel Goffman, Chair 
Institutional Review Board

DATE: March 24, 1998

RE: Human Subjects Protocol I.D. -IRB #98-203

Your protocol entitled "The Relationship Between Young children's Understanding of Conservation and Beginning Reading" has recently been approved as revised as an exempt study by the Institutional Review Board. Such approval is in force during the project dates March 20, 1998 to March 20, 1999.

It is the responsibility of the P.I. and/or faculty supervisor to inform the IRB:

- when the project is completed, or
- if the project is to be extended beyond the approved end date,
- if the project is modified,
- if the project encounters problems,
- if the project is discontinued.

Any of the above notifications should be addressed in writing to the Institutional Review Board, c/o the Office of Academic Research & Sponsored Programs (2100 Riverside Avenue). Please reference the above identification number in any communication to the IRB regarding this project. Be sure to allow sufficient time for extended approvals.

kdd

pc: Lynn Staley

APPENDIX B

Muncie Community Schools Approval

RECEIVED FEB 23 1998
STUDENT

RESEARCH APPLICATION
Muncie Community Schools
2501 N. Oakwood Avenue
Muncie, Indiana 47304

Researcher Information

Applicant Jennifer Givens
Local Address Wood Hall
and Telephone 314-4991
Permanent Address 219 N. Linda St. Hobart
and Telephone (317) 947-1228
Date Submitted _____
Signature of University Supervisor
Dr. Lynn Stealy
Signature of OPLE Director _____

Muncie Research Office Use

Date Received by MCS 2/23/98
Date of MCS Research Review Board Input
2/27/98
Approved by Superintendent's Designee
2/27/98
Approved by Director of Research
Candidate Notified 2/27/98
Consents Obtained, if Applicable _____
Data Gathered _____
Copy of Written Study Received _____

1. Title of Study: The Relationship Between Young Children's Understanding of Conservation and Beginning Reading
2. Research Area: Elementary Education
3. Members of Study Committee and Areas of Expertise:

4. Purpose(s) of Study: Honors thesis (HOURS 499)
5. Attach copies of proposal abstract, measurement instruments, and description of method of treatment, as appropriate.
6. Selection of Participants:
Number to be selected: 22
How they will be selected: Members of first grade class

Grade Levels to Be Involved: First

Teacher(s) and School(s) Involved: Mrs. Judi Beece, Sutton Elementary School

7. Requested Beginning Date: 02/23/98
Approximate Closing Date: 04/30/98

8. **Materials:** Do you plan to administer any instruments of measurement such as tests, inventories, surveys, or self-constructed instruments? YES ☒ NO ☐
If so, list by title below, describe, and estimate the time involved in giving each.
Who will administer these? (Enclose copies) Unit Reading Skills Assessment
from Treasury of Literature, already given by Mrs. Reece.
I will use scores.

Do you plan to give any treatment to participants? YES ☐ NO ☒
If so, describe in detail and estimate the time involved for each.
Who will administer the treatment? (Enclose copies) 2 hours at most

9. Describe the research design and statistical analysis (as appropriate) of your study:

Correlational Study

10. Attach proposal or well developed synopsis.

11. Anticipated use to be made of study: Explain. To facilitate the teaching
of reading to preservice teachers

12. What value is the study to the Muncie Community Schools? The information
may prove useful to teachers of beginning reading.

13. Is university credit sought? YES ☒ NO ☐; do you plan to publish? ☐
Doctoral degree? ☐
Masters degree? ☐
Post graduate work? ☐

14. Consent to Conduct Research in MCS:

The researcher(s) will treat the results of this project with complete confidentiality. Particular schools/programs will not be named in the study, though it will be disclosed that the statistics were derived at a certain grade level, class, or classification (L.D., etc.) from a survey conducted among Muncie school personnel and students. Muncie Community Schools Research Office will receive a copy of the completed study, including an abstract which MCS may publish. The researcher(s) may be invited to share findings with MCS staff.

When students and staff are used as human subjects, written MCS consents from parents and adults are required.

Parents may withdraw consent for participation at any time. No student is at any risk by participating in this study.

Signature of Researcher(s):

Jennifer A. Givens
Patricia A. Hughes

APPENDIX C

Parental Permission Form

Dear Parents,

My name is Jennifer Givens and I am a junior at Ball State University. I am majoring in elementary education and I am currently working on an honors thesis. I am studying the relationship between conservation and beginning reading. Conservation is the understanding that matter may change form without the amount of matter changing. I believe this understanding may play a part in how children learn to read. In order to test this idea, I would like to perform a "test," in which I will show your child two equal sized balls of clay, roll one ball into a rope, and ask the child if the pieces of clay are the same size. I will compare these results with grades on a standard reading test. The results of this study will be completely **anonymous**. Further, if your child does not wish to participate, he will not be forced to. Participation is strictly **voluntary**. I am conducting this study under the advisement of Dr. Lynn Staley of the Elementary Education Department. I greatly appreciate your time and help, and I will provide you with a copy of my results at the conclusion of the study. If you would like your child to participate, please sign the attached permission slip and return it to Mrs. Reece by Monday, April 13, 1998.

Feel free to contact me with any questions at 214-4991. Thank you for your help.

Jennifer A Givens

I give my child, _____, permission to participate in the study conducted by Jennifer Givens at Sutton Elementary School on Monday, April 13, 1998.

X _____

APPENDIX D

Project Proposal

The Relationship Between Young Children's Understanding of Conservation and Beginning Reading

The development of conservation of matter occurs when children understand that while the form of matter may change, the matter itself remains the same. In learning to read, children memorize twenty-six letters and the sounds that those letters make. My hypothesis is that children who have not yet developed conservation of matter may encounter difficulty in reading. If a child does not understand that matter may change form, he may not understand the complex sound-symbol relationships in reading, particularly the relationship between the symbols for upper and lower-case letters. In reading, different shapes represent both different and same sounds (C=ka, c=ka, c=ss, etc.). Additionally, different shapes represent different and same letters (C=see, D=dee, c also=see). The purpose of this study is to examine the relationship between beginning reading and conservation of *matter*, because I am focusing on the understanding of different shapes representing the same letter. I plan to test this hypothesis in a first grade class of 22 students at Sutton Elementary. I will use scores from a standard test produced by a textbook company and administered by the students' teacher. I will then administer a Piagetian task for conservation of matter, asking students to judge whether or not two identical balls of clay remain the same size after one is rolled into a tube shape. I will compare those results with the reading scores to identify a correlation. The purpose of this study lies in its possible use in the education of future teachers. **Participation in this study will be strictly voluntary.** Students will be free to discontinue participation at any time without prejudice from the investigator. **There will exist no means by which subjects could be identified, all responses will be completely anonymous.** I will send a letter of permission home with each student to be signed by their parent or guardian and returned, without which they will not be allowed to participate. Actual administration of the Piagetian task should take no more than two hours, with each child spending less than five minutes in participation. I will make a copy of the results available to the teacher, parents and the Muncie School Board.

APPENDIX E

Piagetian Task for Conservation of Matter

PIAGET TASK 7 -- CONSERVATION OF MATTER

Purpose:

To discover if a student understands that the amount of a matter remains the same even though its shape is changed. The child who is unable to decenter will be unable to grasp that the amount stays constant, since he/she will concentrate on only one quality. The older student will be able to allow for both qualities at once. He/she will be able to mentally reverse the action which changed the shape of the matter, which means he/she is capable of dealing with operations. However, if you ask him/her to deal with an abstract (not actually present) situation of a similar type, he/she may experience difficulty, indicating that he/she is at the level of concrete operations.

Equipment:

A small amount of clay.

Procedure:

Take a piece of clay, and divide it as equally as possible. Roll the pieces into two balls, and ask the student if he/she thinks the two are the same size. If he/she says that one is bigger than the other, ask him/her to remove as much as necessary from the larger ball until he/she is satisfied that they are identical. Then in view of the student, take one ball, roll it into a sausage shape and ask: "Is there more clay here (point to ball) or here (point to sausage), or do they both have the same amount of clay?"

Student's response:

Then, in view of the student, roll the sausage shape back into a ball and ask: "Is there more clay here (point to one ball), or here (point to the other ball), or are they the same?"

Note the student's response

Student participation is voluntary. Students may choose not to participate at any time.

APPENDIX F

Harcourt Brace Unit Reading Skills Assessment

UNIT READING SKILLS ASSESSMENT

JUMP RIGHT IN

NAME _____ DATE _____

SKILL AREA		CRITERION SCORE	PUPIL SCORE	PUPIL STRENGTH
DECODING				
PHONIC ANALYSIS		9/12		
Vowels: /e/e, /i/i	3/4			
Initial clusters with r	3/4			
Final consonants: /m/m, /p/p, /k/ck, /l/l	3/4			
STRUCTURAL ANALYSIS		6/8		
Inflections: -ed, -ing (no spelling changes)	3/4			
Contractions: n't, 's (is)	3/4			
VOCABULARY KEY WORDS		8/10		
COMPREHENSION SEQUENCE		3/4		
TOTAL SCORE		26/34		

HARCOURT
BRACE

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1 2 3 4 5 6 7 8 9 10 073 97 96 95 94

DECODING: Phonic Analysis

Sample

I sleep in a big _____.

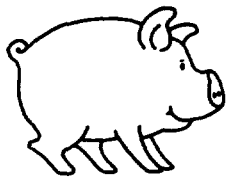


☐ sat

☐ fed

☐ bed

1



My dog likes to _____ holes.

☐ big

☐ dig

☐ hot

2



My new _____ is a cat.

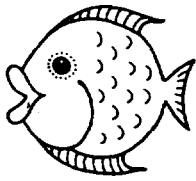
☐ let

☐ pet

☐ mat

DECODING: Phonic Analysis (continued)

3



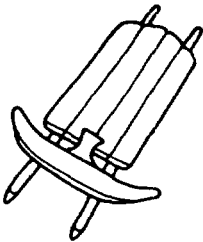
How did you _____ your tent?

☐ lip

☐ map

☐ rip

4



Will you please _____ the table?

☐ set

☐ met

☐ cot

DECODING: Phonic Analysis

Sample That is a big _____.

☐ grass ☐ from ☐ tree

1 Did you see the _____ hop?

☐ trunk ☐ frog ☐ green

2 The man can jump down from the _____.

☐ truck ☐ grand ☐ friend

3 Can you cut the _____?

☐ from ☐ try ☐ grass

4 Kim is my good _____.

☐ green ☐ friend ☐ truck

DECODING: Phonic Analysis

Sample _____ the toy on the floor.

☐ Fall ☐ Roll ☐ Call

1 He will _____ up the baby.

☐ rock ☐ sock ☐ pick

2 I will ask _____ to play.

☐ him ☐ ham ☐ from

3 _____ you play with the baby?

☐ Ball ☐ Pull ☐ Will

4 I saw the frog _____ away.

☐ hop ☐ cap ☐ tip

DECODING: Structural Analysis

Sample The frog was _____ on the grass.

☐ jumping ☐ jump ☐ jumps

1 Tim _____ if he could go with us.

☐ asking ☐ ask ☐ asked

2 I am _____ for my cat.

☐ look ☐ looking ☐ looks

3 She _____ for a pet pig.

☐ wished ☐ wish ☐ wishing

4 The dog is _____ ball with me.

☐ played ☐ plays ☐ playing

DECODING: Structural Analysis

Sample I don't know where she is.☐ is not ☐ do not ☐ did not**1** Where's your new hat?☐ Where is ☐ She is ☐ What is**2** She couldn't see the bird in the tree.☐ can not ☐ could not ☐ did not**3** He's going to go swimming.☐ How is ☐ It is ☐ He is**4** I didn't dig that big hole.☐ is not ☐ did not ☐ do not

VOCABULARY: Key Words

Sample He saw _____ little ducks swimming.

☐ four

☐ said

☐ fly

1 The bird flew into the _____.

☐ here

☐ tree

☐ over

2 She _____ playing with the baby.

☐ but

☐ look

☐ was

3 _____ is my hat?

☐ Where

☐ We

☐ Well

VOCABULARY: Key Words (continued)

4 I'll be back at _____ o'clock.

☐ six

☐ out

☐ like

5 I wish I _____ fly like a bird.

☐ came

☐ how

☐ could

6 The grass is _____ this morning.

☐ men

☐ they

☐ wet

7 What _____ is this?

☐ day

☐ pulled

☐ over

VOCABULARY: Key Words (continued)

8 The mother hen is looking for her _____.

☐ one ☐ chick ☐ swim

9 Did you hear the duck _____?

☐ quack ☐ was ☐ fly

10 What is _____ name?

☐ away ☐ get ☐ your

COMPREHENSION: Sequence

Linda and Sara went to the beach.
First, they went into the water to swim.
Linda's mom sat on the sand. Then
they played with a ball. Before they left
the beach, they made a sand castle.

Sample

What did Linda and Sara do first at the beach?

- ☐ They went into the water.
- ☐ They made a sand castle.
- ☐ They played with a ball.

COMPREHENSION: Sequence (continued)

1 What happened after the girls played ball?

- ☐ They made a sand castle.
- ☐ Linda's mom sat on the sand.
- ☐ They went for a swim.

2 What did they do after they made a sand castle?

- ☐ They went into the water.
- ☐ They left the beach.
- ☐ They played ball.

COMPREHENSION: Sequence (continued)

Today is Saturday. First, Tim got out of bed. Then he ate ham and eggs for breakfast. After breakfast, Tim helped his dad clean up the den. After that, Tim went out to ride his bike.

3 What did Tim do after cleaning up the den?

- ☐ He got up.
- ☐ He ate breakfast.
- ☐ He went out to ride his bike.

4 What did Tim do first?

- ☐ He cleaned the den.
- ☐ He got out of bed.
- ☐ He ate ham and eggs.